

In the Claims:

1. A battery separator for a lithium-ion secondary battery comprises:

a microporous membrane, said membrane having a thickness of 25 μm or less, said membrane being made of a thermoplastic, and an effective amount of an adjuvant adapted to reduce or eliminate energy concentrations around the separator, said energy concentrations being sufficient to initiate a reaction between components of said lithium ion secondary battery, said adjuvant being mixed into said membrane or coated thereon.

2. The battery separator of Claim 1 wherein said thermoplastic being polyethylene or copolymers of polyethylene.

3. The battery separator of Claim 1 herein said lithium ion secondary battery components being selected from the group consisting of anode materials, cathode materials, electrolytes, and separators.

4. The battery separator of Claim 1 wherein said adjuvant being adapted to quench or to retard said energy's ability to initiate a reaction between said lithium ion secondary battery components.

5. The battery separator of Claim 4 wherein said adjuvant being selected from the group consisting of: phosphates, halogenated polyethylene wax, triazine derivatives, and combinations thereof.

6. The battery separator of Claim 5 wherein said phosphate comprises a triphenyl phosphate.

7. The battery separator of Claim 6 wherein said triphenyl phosphate being about 1-60% by weight of the membrane of a substituted triaryl phosphate.

8. The battery separator of Claim 5 wherein said halogenated polyethylene wax comprises between about 2-20% by weight of said membrane.

9. The battery separator of Claim 5 wherein said triazine derivative comprises between about 0.5-10% by weight of said membrane.

10. The battery separator of Claim 1 wherein said adjuvant being adapted to conduct away said energy.

11. The battery separator of Claim 10 wherein said adjuvant being selected from the group consisting of inorganic materials, carbon black, organic materials, and combinations thereof.

12. The battery separator of Claim 11 wherein said inorganic materials being selected from the group consisting of Al_2O_3 , SiO_2 , TiO_2 , and combinations thereof.

13. The battery separator of Claim 11 wherein said inorganic material comprises about 1-40% by weight of said membrane.

14. The battery separator of Claim 11 wherein said carbon black comprises about 1-40% by weight of said membrane.

15. The battery separator of Claim 11 wherein said organic material being selected from the group consisting of polyaniline, polyacetylene, and combinations thereof.

16. The battery separator of Claim 1 wherein said adjuvant being adapted to decompose to a gas.

17. The battery separator of Claim 16 wherein said adjuvant being selected from the group consisting of tetrazole-based compounds, semicarbazide-based compounds, and combinations thereof.

18. The battery separator of Claim 17 wherein said adjuvant comprises about 1-40% by weight of said membrane.

19. The battery separator of Claim 20 wherein said adjuvant comprises about 10-30% by weight of said membrane.

20. The battery separator of Claim 17 wherein said tetrazole-based compound being 5-phenyl tetrazole.

21. The battery separator of Claim 17 wherein said semicarbazide-based compound being p-toluenesulfonyl semicarbazide.

22. A lithium ion battery having the separator according to claim 1.